varied from 0 to 46.8% (median 4.2%) in the primary tumour. The Tmax/Mmean ranged from 1.37 to 4.23 (median 1.98). There was no correlation between lesion size and SUVmax or between lesion size and HF, which suggests that larger tumours are not necessarily more hypoxic than smaller tumours. A significant correlation between Tmax/Mmean and HF was observed (rho = 0.83, $p < 0.001$), and between SUVmax and HF (rho = 0.74, $p = 0.004$). This may suggest that tumours with a higher SUVmax (ie. higher intensity of hypoxia) also have a larger proportional volume of hypoxia.

Conclusions: 18F-FAZA PET scans provide a feasible non-invasive method to assess NSCLC tumour hypoxia. A hypoxic volume, as detected by 18F-FAZA PET, was present in the majority of NSCLC patients in our study. Ongoing trial accrual and follow up of our patient cohort will provide more information with regards to the imaging and clinical value of 18F-FAZA PET, and we hope to correlate these imaging metrics with clinical outcomes.

168

DEVELOPMENT OF PROVINCIAL PALLIATIVE RADIOTHERAPY GUIDELINES

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Purpose: Radiotherapy (RT) practice variability in the palliative setting is well-documented. Clinical practice guidelines inform standardized, evidence-based, beneficial practice, while simultaneously discouraging unnecessary or potentially harmful practices. The process of creating provincial palliative RT clinical practice guidelines is associated with multiple challenges. We describe the unique approach required in aligning multidisciplinary goals as compared to traditional tumour site-specific guidelines.

Methods and Materials: Radiation oncologists from the provincial Palliative Care Tumour Team, along with guideline specialists from the Guideline Resource Unit, formed the primary guideline working group tasked with updating the Palliative RT guidelines. Tumour site specific representatives (ex. Central Nervous System Tumour Team) were incorporated as needed, as well as experts in supportive care, on a guideline by guideline basis. For each guideline, a systematic literature review was conducted to identify relevant evidence. Recommendations were initially developed within the primary working group, then revised in collaboration with experts from other disciplines. Once working group consensus was reached, guideline recommendations were circulated to all radiation oncologists and Palliative Tumour Team members for input. After several rounds of feedback and modifications, provincial consensus was reached.

Results: Initially, one RT guideline had been created for all provincial palliative RT recommendations. These guidelines have since been split into smaller, more functional palliative RT guidelines: 1) Brain Metastases; 2) Bone Metastases and Spinal Cord Compression; 3) Bleeding and Gastrointestinal Obstruction; and 4) Superior Vena Cava Obstruction, Dyspnea, and Hemoptysis. The majority of recommendations were either modified or new due to advancements in research or changes in consensus based approaches. In total, 70 recommendations were approved. Recommendations were supported by a range of evidence from high (level one evidence) to low quality (consensus opinion).

Conclusions: By combining the newly updated palliative RT guidelines with an educational intervention, variations in practice may be mitigated. Using our model, similar efforts can be undertaken in other jurisdictions.

169

SYSTEMATIC REVIEW OF PATIENT REPORTED QUALITY OF LIFE FOLLOWING STEREOTACTIC ABLATIVE BODY RADIOTHERAPY FOR PRIMARY AND METASTATIC LIVER CANCER

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Purpose: Stereotactic ablative body radiotherapy (SABR) is an emerging modality in patients with liver cancer who are ineligible for other local therapies. It has been shown to be effective with respect to long-term tumour control with minimal toxicity. However SABR for liver cancer is not current standard of practice despite its potential promise. In order to validate increased offering of this promising therapy, objective systematic data regarding impact on quality of life (QOL) is required. No systematic reviews to date have been performed to analyze QOL for primary or metastatic liver cancers. QOL metrics are a critical part of therapy evaluation, particularly in disease states with short life expectancy. The purpose of this study was to conduct a systematic review of evidence surrounding QOL for liver SABR.

Methods and Materials: MEDLINE and EMBASE databases from 1996 to October 2015 were queried to obtain English language studies analysing QOL following SABR for liver cancers. Included studies involved patient-reported QOL as either a primary or secondary endpoint, along with analysis of QOL change over time. Studies were screened by three reviewers, while relevant data were abstracted and analyzed by a single reviewer.

Results: Of 2181 initially screened studies, five met all inclusion criteria and were analyzed. Extracted study dates ranged from 2008 to 2015, included a total of 388 eligible patients, and 4/5 studies were prospective in design. All were published studies, with the exception of one conference abstract. Studies included patients with hepatocellular carcinoma, liver metastases and intrahepatic cholangiocarcinoma. Extracted studies were heterogeneous in dose prescription used (11-70 Gy in 3 – 30 fractions), as well as in QOL metrics (EORTC QLQ C-15 PAL,/C-30/LM-21, Euroqol 5D, FACT-Hep, FLIC) and final endpoints (range: six weeks to 12 months). Despite this there were few clinically or statistically significant declines in QOL scores following SABR. Four studies demonstrated increased fatigue transiently in the first 1-4 weeks, while two studies showed transient worsening of appetite at one month; both metrics returned to insignificant difference from baseline by the final endpoints. All studies showed no significant decline in QOL at their respective endpoints. In studies with overlapping QOL tools, estimates of three-month post-SABR global QOL were similar.

Conclusions: Results of this systematic review demonstrate well-preserved post SABR QOL in patients with otherwise untreatable liver cancer, despite heterogeneity amongst the individual studies themselves. These findings merit further research to increase data collection, to validate QOL tools specific to SABR for liver cancers, and to support comparative effectiveness trials of SABR with other local modalities in liver cancer including surgery, chemoembolization and radiofrequency ablation, with a focus on QOL outcomes as an important endpoint.

170

A SYSTEMATIC REVIEW OF METHODOLOGIES, ENDPOINTS AND OUTCOME MEASURES IN PHASE III RANDOMIZED TRIALS OF INTERVENTIONS FOR RADIATION THERAPY-INDUCED NAUSEA AND VOMITING

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Purpose: Clinical trials in radiation therapy-induced nausea and vomiting (RINV) appear to have varied methodologies, endpoints and outcome measures. This variability hinders implementation of trial results. A comprehensive analysis of RINV trial design elements is lacking.
Methods and Materials: Ovid versions of the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews, EMBASE and MEDLINE to first quarter 2011 were searched for randomized trials of RINV management strategies.
Results: From 599 references in the initial database search we selected 34 trials for analysis that collectively randomized 4529 patients. Twenty-eight trials (82%) were published prior to the year 2000. Twenty-seven trials (79%) involved multiple fraction radiation therapy (RT) and seven (21%) single fraction RT. Twenty-four trials (71%) evaluated prophylactic interventions and nine (26%) rescue interventions. Thirty-three trials (97%) evaluated pharmacologic interventions. Nausea was not defined in any trial but was reported as a stand-alone symptom in 26 trials (76%) and was graded in 20 (59%), with discrete choice categorical qualitative scales being the most common method. Vomiting was defined in three trials (9%), reported as a stand-alone symptom in 17 (47%) and was graded in seven (21%), with continuous numerical scales being the most common method. Retching was defined in three trials (9%), was not reported as a stand-alone symptom in any trial and was graded in one (3%). Twenty-one trials (62%) created compound symptom measures that combined individual symptoms. Fifteen trials (44%) reported on "emetic episodes/events" but only nine of these defined them. Seventeen trials (50%) reported on complicated endpoints such as "response," "control" and "success" that factored in multiple symptom or compound symptom measures, but seven of these did not define them comprehensively. Only 10 trials (29%) defined a primary endpoint a priori.
Conclusions: Methodologies, endpoints and outcome measures varied considerably among 34 randomized trials in RINV.

171
PROPHYLAXIS OF RADIATION-INDUCED NAUSEA AND VOMITING: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS
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Purpose: To systematically review the efficacy and safety of various antiemetics in prophylaxis of radiation-induced nausea and vomiting (RINV).
Methods and Materials: A literature search of Ovid MEDLINE, EMBASE and Cochrane CENTRAL was performed to identify randomized controlled trials (RCTs) that evaluated the efficacy of prophylaxis for RINV in patients receiving radiotherapy to abdomen/pelvis, including total body irradiation (TBI). Primary endpoints were complete control of nausea and complete control of vomiting during acute and delayed phases. Secondary endpoints included use of rescue medication, quality of life and incidence of adverse events.
Results: Seventeen RCTs were identified. Among patients receiving radiotherapy to abdomen/pelvis, our meta-analysis showed that 5-hydroxytryptamine-3 receptor antagonists (5HT3 RAs) were significantly more efficacious than placebo and dopamine antagonists in both complete control of vomiting (OR 0.49, 95% confidence interval [CI] 0.33-0.72 and OR 0.17, 95% CI 0.05-0.58 respectively) and complete control of nausea (OR 0.43, 95% CI 0.26-0.70 and OR 0.46, 95% CI 0.24-0.88 respectively). 5HT3 RAs were also more efficacious than rescue therapy and dopamine antagonists plus dexamethasone. The addition of dexamethasone to 5HT3 RA compared to 5HT3 RA alone provides a modest improvement in prophylaxis of RINV. Among patients receiving TBI, 5HT3 RA was more effective than other agents (placebo, combination of metoclopramide, dexamethasone and lorazepam).
Conclusions: 5HT3 RAs are more effective than other antiemetics for prophylaxis of RINV in patients receiving radiotherapy to abdomen/pelvis and TBI. Future RCTs should investigate the efficacy of newer agents such as aprepitant in addition to 5HT3 RAs in prophylaxis of RINV during both acute and delayed phases.

172
FEASIBILITY AND UTILITY OF PATIENT REPORTED OUTCOME COLLECTION IN A PROVINCIAL PROGRAM
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Purpose: The British Columbia Cancer Agency radiotherapy (RT) program started the Prospective Outcomes and Support Initiative (POSI) at all six centres in 2013 to collect and utilize patient reported outcomes (PROs) for immediate clinical care, quality improvement, and research. We sought to explore the feasibility and utility of using PRO two years after the start of POSI.
Methods and Materials: PROs were collected at time of CT simulation via tablet or radiation therapist questions, and 2-4 weeks post-RT over the phone with a registered nurse (RN). Descriptive Statistics were used to present accrual and utility of PRO data. Comparison in accrual rates between categories was performed with chi square tests. Mean differences in time that RNs spent on POSI phone calls were compared with t-tests. Multivariable logistic regression modeling identified factors associated with successful accrual.
Results: From May 2013 to July 2015, 2849 patients were approached by POSI on 5,847 occasions for patients treated with RT for bone metastases (81%), brain metastases (12%), and incurable lung cancer (7%). The accrual rate for all encounters was 76% (n = 4904), ranging from 73% to 87% depending on cancer centre ($p < 0.001$), and highest amount patients with bone metastases (78%), followed by lung cancer (75%) and brain metastases (65%; $p < 0.001$). Patients were significantly less likely to be successfully accrued at follow up compared to baseline (OR = 0.21; 95% CI = 0.18 – 0.24; $p < 0.001$), as were those with brain metastases (OR = 0.50; 0.41 – 0.1; $p < 0.001$). During the study period RNs made 2042 telephone follow up calls, totaling 250 RN hours, to both collect PRO, and subsequently use these PRO to guide follow up care. The RN-reported mean time to complete the follow up call was highest with brain metastases (13.1 minutes) compared to lung cancer (8.2 minutes) and bone metastases (6.7 minutes), which was highly significant ($p < 0.001$). The RN phone calls that required the RN to offer additional support were significantly longer than phone calls where no support was needed (mean 12.1 versus 6.4 minutes; $p < 0.001$). From this database we have demonstrated similar patient reported pain improvement with single versus multiple fraction RT (presented previously), and have used data to lead quality improvement initiatives, such as identifying patients who did not have a dexamethasone weaning protocol. Other quality improvement and research utility of the POSI database will be described.
Conclusions: Population-based collection and utilization of PRO for clinical care, quality improvement, and research is feasible and associated with only a modest increase in resources and workload. Further research is needed on how to best incorporate